

WHAT IS CLAIMED IS:

1. A conveyor system for processing substrates in plural vacuum processing chamber installation portions, the conveyor system including:

an atmospheric loader, exposed to the air;

a vacuum loader; and

double lock chambers, having an atmospheric loader side and a vacuum loader side, and having a gate valve for said atmospheric loader side and another gate valve for said vacuum loader side, wherein said vacuum loader has

(1) a transfer chamber connected to the double lock chambers via the another gate valve,

(2) a conveyor structure; and

(3) plural vacuum processing chamber installation portions,

wherein said atmospheric loader has a robot transferring selectively substrates to be processed, one by one, from said atmospheric loader to either of said double lock chambers;

after transferring substrates to either of the double lock chambers, providing a vacuum in said either of the double lock chambers;

said vacuum loader has a robot which after providing a vacuum in said either of the double lock chambers, transfers substrates to be processed, one by one, from said either of the double lock chambers to at least one of said plural vacuum

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processing chamber installation portions, via said transfer chamber;

substrates are processed in at least one of said vacuum processing chamber installation portions; and

the robot in said vacuum loader, after said processing, transfers processed substrates, one by one, from said at least one of said plural vacuum processing chamber installation portions to either of said double lock chambers, via said transfer chamber.

2. The conveyor system according to claim 1, wherein said substrates are transferred between said either one of the double lock chambers and said at least one of said plural vacuum processing chamber installation portions by said conveyor structure, said conveyor structure being a single conveyor located in said transfer chamber.

3. The conveyor system according to claim 1, wherein the substrates are transferred via only the transfer chamber of the vacuum loader, and gate valves therefore, in being transferred between the either one of the double lock chambers and the at least one of said plural vacuum processing chamber installation portions.

4. The conveyor system according to claim 1, wherein the substrates are semiconductor wafers.

5. The conveyor system according to claim 1, wherein

after providing the vacuum in the either one of the lock chambers, substrates to be processed are transferred one by one from the either one of the lock chambers to said at least one of said plural vacuum processing chamber installation portions, via the transfer chamber;

wherein the substrate are processed one by one in each of the plural vacuum processing chamber installation portions; and wherein, after said processing, the processed substrates are transferred one by one from the at least one of the plural vacuum processing chamber installation portions to either of said double lock chambers, via the transfer chamber.

6. The conveyor system according to claim 1, wherein the substrates to be processed are transferred directly from the atmospheric loader to the either one of the double lock chambers.

7. A conveyor system used in transferring substrates to be processed to a vacuum processing chamber installation portion, comprising:

a robot transferring selectively said substrates to be processed in said vacuum processing chamber installation portion from an atmospheric loader, exposed to the air, to one of double lock chambers, the substrates being transferred one by one;

a vacuum providing device in the one of the double lock chambers, after substrates to be processed have been transferred thereto; and

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another robot transferring the substrates from the one of the double lock chambers to a vacuum loader, for loading the substrates into the vacuum processing chamber installation portion, the vacuum loader having gate valves for introducing substrates into the vacuum processing chamber installation portion, and also having a transfer chamber and a conveyor structure.

8. The conveyor system according to claim 7, wherein the substrates are semiconductor wafers.

9. The conveyor system according to claim 7, wherein the conveyor structure is a single conveyor, which transfers the substrates, one by one, between the one of the double lock chambers and the vacuum loader.

10. The conveyor system according to claim 7, wherein the substrates are transferred one by one between the one of the double lock chambers and the vacuum loader.

11. The conveyor system according to claim 7, wherein the substrates to be processed are transferred directly from the atmospheric loader to the one of the double lock chambers.

12. An apparatus for treating at least one wafer by vacuum processing, comprising:

(i) a cassette table for placing a cassette, containing at least one wafer to be processed, exposed to the air,

(ii) a first conveyor loading said at least one wafer sequentially in order from said cassette to a selected load lock chamber and a second conveyor in a transfer chamber under vacuum, transferring the at least one wafer into a plurality of vacuum processing chambers connected to said transfer chamber;

(iii) said vacuum processing chambers processing said at least one wafer under vacuum; and

(iv) said first and second conveyors unloading vacuum processed wafers from said vacuum processing chambers into said cassette at said cassette table,

wherein the at least one wafer is transferred from the cassette on the cassette table to the vacuum processing chambers by the first conveyor and the second conveyor in a state that each of the wafers is kept horizontal during a transportation of each wafer from the cassette table to each of the vacuum processing chambers.

13. The apparatus according to claim 12, wherein the first and second conveyors unload vacuum processed wafers such that said vacuum processed wafers are returned to their respective original positions in said cassette.

14. The apparatus according to claim 12, wherein said first conveyor carries a wafer from said cassette to said load lock chamber.

15. An apparatus for transferring cassettes in operating

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a vacuum processing apparatus, the vacuum processing apparatus including:

an atmospheric loader, exposed to the air;

a vacuum loader; and

double lock chambers for connecting said atmospheric loader and said vacuum loader,

wherein said atmospheric loader includes a cassette mount unit located outside of said double lock chambers,

said cassette mount unit has a cassette positioning plane which is a substantially horizontal plane in which all cassettes, containing samples to be processed and exposed to the air, are positioned in a row in front of a front wall of said double lock chambers, and

said cassette positioning plane is oriented such that a cassette is placed on and removed from said cassette positioning plane so as to maintain a surface of a sample to be processed, of a sample in said cassette, substantially horizontal when the cassette containing the sample is on the cassette positioning plane,

wherein said sample is transferred from said atmospheric loader to a lock chamber, selected from said double lock chambers, while maintaining said sample surface to be processed substantially horizontal.

16. The apparatus according to claim 15, further comprising a first conveyor to transfer samples directly from the atmospheric loader to the lock chamber.

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17. An apparatus for transferring cassettes in operating a vacuum processing apparatus, the vacuum processing apparatus including:

an atmospheric loader, exposed to the air;

a vacuum loader; and

double lock chambers for connecting said atmospheric loader and said vacuum loader,

wherein said atmospheric loader includes a cassette mount unit located outside of said lock chamber,

said cassette mount unit has a cassette positioning plane which is a substantially horizontal plane in which all cassettes, containing samples to be processed and exposed to the air, are positioned in a row in front of a front wall of said lock chamber, and

said cassette positioning plane is oriented such that a cassette is placed on and removed from said cassette positioning plane so as to maintain a surface of a sample to be processed, of a sample in said cassette, substantially horizontal when the cassette containing the sample is on the cassette positioning plane, and

an automatic cassette loader for loading cassettes into the atmospheric loader, wherein said automatic cassette loader loads cassettes into the atmospheric loader so as to maintain the sample surface substantially horizontal, and

wherein said cassette is removed from said cassette positioning plane of said cassette mount unit by said automatic cassette loader, in accordance with data sent from a host control apparatus, while maintaining said sample surface

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substantially horizontal, and said vacuum processing apparatus automatically executes a sample processing, based on processing data.

18. The apparatus according to claim 17, further comprising a first conveyor that transfers samples directly from the atmospheric loader to the double lock chambers.

19. An apparatus for vacuum processing a substrate using plural vacuum processing chambers, comprising:

a transfer conveyor carrying in the substrate, disposed under atmospheric pressure, into a vacuum processing chamber, of said plural vacuum processing chambers, using a lock chamber selected from double lock chambers, wherein said substrate is carried from a cassette which is placed on a cassette table exposed to the air, said vacuum processing chamber processing said substrate; and

said transfer conveyor carrying out said substrate, processed in said vacuum processing chamber, into said atmospheric pressure, using another lock chamber of the double load lock chambers.

20. The apparatus according to claim 19, wherein carrying in and carrying out of said substrate are performed sequentially.

21. The apparatus according to claim 19, wherein in said vacuum processing chamber, a processing selected from the

group consisting of dry etching, chemical vapor deposition and sputtering is performed.

22. The apparatus according to claim 19, wherein the substrate is carried directly from the cassette on the cassette table, into said lock chamber.

23. An apparatus for vacuum processing a substrate using plural vacuum processing chambers, such that the substrates are processed one by one, comprising:

a transfer conveyor carrying in a substrate, disposed under atmospheric pressure, into one of the vacuum processing chambers, using a lock chamber selected from double lock chambers, wherein said substrate is carried in from a cassette which is placed on a cassette table exposed to the air, said substrate being processed in said one of said vacuum processing chambers; and

said transfer conveyor carrying out said substrate, processed in said one of said vacuum processing chambers, into said atmospheric pressure, using another lock chamber of the double load lock chambers,

wherein said transfer conveyor includes a first robot that faces to a set of substrates disposed in the cassette and transfers the substrates one by one to the lock chamber, and a second robot that is disposed in a conveyor chamber of a vacuum loader so as to face the lock chamber.

24. The apparatus according to claim 23, wherein the

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substrate is carried directly from the cassette on the cassette table, into said lock chamber.

25. An apparatus for vacuum processing a substrate using plural vacuum processing chambers, comprising:

a transfer conveyor carrying in the substrate, disposed in an atmospheric different from an atmosphere in one of said plural vacuum processing chamber, into said one of the plural vacuum processing chambers, using a lock chamber selected from double lock chambers, wherein said substrate is carried in from a cassette which is placed on a cassette table exposed to the air, the one of the plural vacuum processing chambers processing said substrate; and

said transfer conveyor carrying out said substrate, processed in the one of the plural vacuum processing chambers, into said atmosphere different from said atmosphere in the one of the plural vacuum processing chambers, using another lock chamber of the double lock chambers,

wherein the transfer conveyor includes a robot that faces to a set of substrates disposed in the cassette and transfer the substrates one by one to the lock chamber, and another robot that is disposed in a conveyor chamber of a vacuum loader so as to make a rotative movement and a horizontal movement of X and Y axes.

26. The apparatus according to claim 25, wherein the substrate is carried directly from the cassette on the cassette table, into said lock chamber.

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